

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

**Claims 1-22 (Cancelled)**

**Claim 23 (New):** An implantable medical device permitting non-invasive detection of *in vivo* physiological events, comprising a substrate carrier and a sensor element associated with the substrate carrier, wherein the sensor element is capable of detecting an *in vivo* physiological event, altering the state of either the substrate carrier or the sensor element, and adapted to be interrogated by an *ex vivo* detector and returning a defined signal to the detector correlating to the altered state of either the substrate carrier or the sensor element and, thereby, being indicative of the *in vivo* physiological event.

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**Claim 24 (New):** The implantable medical device according to claim 23, wherein the implantable substrate carrier is selected from the group consisting of stent, graft, stent-graft, valve, filter and occluder.

**Claim 25 (New):** The implantable medical device according to claim 24, wherein both the implantable substrate carrier and the sensor element are fabricated from at least one of a shape memory or a superelastic material.

**Claim 26 (New):** The implantable medical device according to claim 25, wherein the at least one of a shape memory or a superelastic material further comprises nickel-titanium alloy.

**Claim 27 (New):** The implantable medical device according to claim 23, wherein the sensor element is fabricated of a biocompatible material different than that of the implantable substrate carrier.

**Claim 28 (New):** The implantable medical device according to claim 23, wherein the sensor element further comprises a plurality of cantilever members.

Claim 29 (New): The implantable medical device according to claim 28, wherein the plurality of cantilever members are fabricated of at least one of a shape memory material, a superelastic material, an elastically deformable material or a plastically deformable material.

Claim 30 (New): The implantable medical device according to claim 29, wherein the plurality of cantilever members further comprise a radiopaque material.

Claim 31 (New): The implantable medical device according to claim 28, wherein the plurality of cantilever members have binary functionality differentially detectable by the detector..

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Claim 32 (New): The implantable medical device according to claim 28, wherein the plurality of cantilever members exhibit a transition state between their binary functional states by one of shape-memory, elastic, plastic or superelastic deformation.

Claim 33 (New): The implantable medical device according to claim 32, wherein the transition state actuated by the *in vivo* physiological event.

Claim 34 (New): The implantable medical device according to claim 33, wherein the *in vivo* physiological event comprises a change in temperature, pressure, or surface coverage as encountered by the implantable medical device.

Claim 35 (New): The implantable medical device according to claim 33, wherein the *in vivo* physiological event is selected from the group consisting of endothelialization, arteriosclerosis, pyrexia, hypertension and stenosis.

Claim 36 (New): The implantable medical device according to claim 32, wherein *ex vivo* detector further comprise one of radiography, ultrasonography, RF imaging, and magnetic resonance imaging.

Claim 37 (New): The implantable medical device according to claim 28, wherein at least some of the plurality of cantilever members have differing conditions of binary functionality than the other plurality of cantilever members..

Claim 38 (New): The implantable medical device according to claim 28, wherein at least some of the plurality of cantilever members further include passive transmitters that operate as detectable electromechanical switches.

Claim 39 (New): The implantable medical device according to claim 28, wherein at least some of the plurality of cantilever members are interrogated with a first resonance frequency emitted by the detector and return a second, altered resonance frequency to the detector indicative of the state of the binary functionality of the plurality of cantilever members.

Claim 40 (New): The implantable medical device according to claim 28, wherein at least some of the plurality of cantilever members further comprise a biochemical marker having selective affinity for a predetermined target.

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Claim 41 (New): The implantable medical device according to claim 40, wherein the predetermined target is selected from the group consisting of antibodies, cell surface proteins, growth factors and ligands.

Claim 42 (New): The implantable medical device according to claim 23, wherein the sensor element further comprises a plurality of binding regions on a surface of the implantable substrate carrier.

Claim 43 (New): The implantable medical device according to claim 42, wherein the plurality of binding regions further comprise a biochemical marker having specific affinity for a predetermined target.

Claim 44 (New): The implantable medical device according to claim 43, wherein binding of the predetermined target to the biochemical marker at the plurality of binding regions causes an altered state of the implantable medical device that is detectable by the detector.

Claim 45 (New): The implantable medical device according to claim 43, wherein the predetermined target is selected from the group consisting of antibodies, cell surface proteins, growth factors and ligands.

Claim 46 (New): A method of detecting *ex vivo* an *in vivo* physiological event in a non-invasive manner, comprising the steps of:

implanting an implantable medical device comprising a substrate carrier having a plurality of sensor elements comprising a plurality of cantilever members associated with the substrate carrier, the sensor element being capable of altering its state upon encountering a predetermine physiological event;

interrogating the implanted medical device with an *ex vivo* detector adapted to emit a signal and receive a returned signal from the implanted medical device; and

detecting the returned signal from the implanted medical device and determining the presence or absence of an altered state of the sensor element from the returned signal indicative of the presence or absence of the physiological event *in vivo*.

Claim 47 (New): The method according to claim 46, the plurality of cantilever members have binary functionality that alter their state upon occurrence of the *in vivo* physiological event and return a shifted signal to the detector indicative of the *in vivo* physiological event.